

IN THE CLAIMS:

The following is a complete listing of the claims in this application, reflects all changes currently being made to the claims, and replaces all earlier versions and all earlier listings of the claims:

C1 1. (Currently amended) A data processing method for processing data in an image printing apparatus subjected to time-division drive of a printhead, said apparatus having an editing buffer and a print buffer, comprising the steps of:

rearranging one word of data corresponding to a plurality of contiguous print elements provided on the printhead, that is stored divisionally in two or more address regions in the editing buffer, and storing the data in one address region in the print buffer.

2. (Currently amended) An image printing apparatus subjected to time-division drive of a printhead, comprising an editing buffer and a print buffer, wherein one word of data corresponding to a plurality of contiguous print elements provided on the printhead, that is stored divisionally in two or more address regions within ~~the~~ said editing buffer, is rearranged in one address region within ~~the~~ said print buffer.

3. (Previously presented) The apparatus according to claim 2, further comprising:

delay means for delaying a set of data that corresponds to contiguous print elements, a number of which is a whole-number multiple of a number of time divisions employed in time-division drive, said delayed data being from the data that has been read out of said editing buffer.

4. (Previously presented) The apparatus according to Claim 3, wherein storage means for a horizontal-to-vertical conversion is used as said print buffer.

5. (Previously presented) An image printing apparatus subjected to time-division drive in which n represents the number of time divisions and one word is composed of m bits, comprising:

data processing means for reading n -bit data corresponding to n contiguous nozzles serves as one unit from an editing buffer and storing contiguous 1-bit data, where the lowest common multiple of n and m is 1, in one address within a print buffer.

6. (Currently amended) An image printing apparatus for processing data in which one word consists of eight bits, comprising:

printhead driving means for discharging ink from four contiguous nozzles of a printhead at different timings;

an editing buffer;

a print buffer for outputting image data to said printhead driving means; and

a data transfer ~~means~~ circuit for reading data from said editing buffer in units of 16-bit data and transferring the data to said print buffer;

~~said wherein said data transfer means circuit rearranging sets of combines and transfers 4-bit data, each set of which corresponds read currently and corresponding to four contiguous nozzles of the printhead, in such a manner that two sets of data are stored in and 4-bit data previously read to one address within said print buffer as 8-bit data.~~

7. (Previously presented) An image printing apparatus subjected to time-division drive, comprising:

an editing buffer and a print buffer for storing image data;

a printhead for performing printing based upon the image data read out of said print buffer; and

means for reading image data from two or more address regions within said editing buffer, which will be printed by driving said printhead one time, and packing the image data in numbers of bits serving as units in which data is read from and written to said editing buffer to store the packed image data in one address region within said print buffer, before the image data is transmitted to said printhead.

8. (Currently amended) A method of controlling an image printing apparatus subjected to time-division drive and having an editing buffer and a print buffer for storing image data and a printhead for performing printing based upon the image data read out of said print buffer, said method comprising ~~a~~ the steps of:

reading image data from two or more address regions within said editing buffer, which will be printed by driving said printhead one time; and,

packing the image data in numbers of bits serving as units in which data is read from and written to said editing buffer to store the packed image data in one address region within said print buffer, before the image data is transmitted to said printhead.

9. (Previously presented) A computer-readable memory storing a control program for controlling an image printing apparatus subjected to time-division drive and having an editing buffer and a print buffer for storing image data and a printhead for performing printing based upon the image data read out of said print buffer, said control program being a program for:

reading image data from two or more address regions within said editing buffer, which will be printed by driving said printhead one time; and,

packing the image data in numbers of bits serving as units in which data is read from and written to said editing buffer to store the packed image data in one

address region within said print buffer before the image data is transmitted to said printhead.

10. (Original) The method according to claim 1, wherein the print element comprises a nozzle to discharge ink.

11. (Original) The method according to claim 2, wherein the print element comprises a nozzle to discharge ink.

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12. (Previously presented) A data processing method for processing data in an image printing apparatus which performs printing by causing a printhead to scan, said printhead having a plurality of print elements arrayed at predetermined angles with respect to the scanning direction of the printhead and subjected to time-division drive, comprising a step of:

rearranging one word of data corresponding to a plurality of contiguous print elements provided on the printhead, that is stored in two or more address regions in an editing buffer, to store the data in one address region in a print buffer.

13. (Original) The method according to claim 12, wherein the print element comprises a nozzle to discharge ink.

14. (Previously presented) A data processing apparatus for processing data in an image printing apparatus which performs printing by causing a printhead to scan, said printhead having a plurality of print elements arrayed at predetermined angles with respect to the scanning direction of the printhead and subjected to time-division drive, wherein one word of data corresponding to a plurality of contiguous print elements provided on the printhead, that is stored divisionally in two or more address regions within an editing buffer, is rearranged in one address region within a print buffer.

C 15. (Currently amended) The apparatus according to claim 14, further comprising:

first storage means for storing data,

~~of~~ wherein the data comprises a plurality of words; and

delay means for delaying an amount of data that corresponds to a whole-number multiple of a number of time divisions employed in time-division drive, ~~said~~ the delayed data being from the data that has been read out of said first storage means.

16. (Original) The method according to claim 14, wherein the print element comprises a nozzle to discharge ink.

17. (Cancelled)

18. (Currently amended) The apparatus according to claim 2, further comprising:

a first register for storing a whole-number multiple of one word of data which is read from two or more address regions within ~~the~~ said editing buffer; and,

a second register for storing a set of data that corresponds to contiguous print elements, a number of which is a whole-number multiple of a number of time divisions employed in time-division drive.

19. (Previously presented) The apparatus according to claim 2, wherein said editing buffer and said print buffer are allocated in different areas within a memory respectively.

20. (Previously presented) A data processing method for processing data in an image printing apparatus subjected to time-division drive of a printhead and having a first storage means and a second storage means, comprising:

a horizontal-to-vertical conversion step of storing data in the first storage means in the horizontal direction and reading data from two or more address regions in the first storage means in the vertical direction;

a rearranging step of rearranging one word of data corresponding to a plurality of contiguous print elements provided on the printhead, which is included in

data read from the first storage means in said horizontal-to-vertical conversion step, to store the one word of data in one address region within the second storage means; and,
a transfer step of transferring the one word of data stored in the one address region within the second storage means to the printhead so as to drive the print elements according to the one word of data.

21. (New) A transfer circuit of an image processing apparatus for transferring data from an editing unit to a print unit, said transfer circuit comprising:
a first register adapted to store 16-bit data;
a second register adapted to store 4-bit data;
a control unit adapted to control the transfer of data from said first register and from said second register to the print unit; and
an address generating unit adapted to generate an address for the data when said control unit transfers the data.

22. (New) A method of transferring data in an image processing apparatus from an editing unit to a print unit, said method comprising the following steps:
storing 16-bit data in a first register;
storing 4-bit data in a second register;
controlling the transfer of data from the first register and from the second register to the print unit; and

generating an address for the data when said controlling step transfers the data,

wherein the address includes a transfer-origin identifier and transfer-destination identifier.

23. (New) A data transfer circuit of an image processing apparatus comprising:

an editing buffer adapted to store data;

a print buffer adapted to print data;

C1 a control unit adapted to control the transfer of data from said editing buffer to said print buffer; and

an address generating unit adapted to generate an address for the data transferred by said control unit,

wherein the data comprises 8-bit image data arranged vertically or horizontally.

24. (New) A transfer circuit of an image processing apparatus for transferring data from an editing unit to a print unit, said transfer circuit comprising:

a conversion register adapted to store data having vertical components;

a selector adapted to extract the vertical-component data from said conversion register;

a register adapted to store data;

C1 a control unit adapted to control said selector and the transfer of data from said register to the print unit; and

an address generating unit adapted to generate an address for the data when said control unit transfers the data.
